AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraph beginning at page 1, line 5, as follows:

The ~~present invention~~ technology described here relates to implementing digital pre-distortion in power amplifiers where memory effects occur and where parameters depend on, for example, the average signal power level or device temperature.

Please amend the paragraph beginning at page 1, line 11, as follows:

Power amplifiers are known to ~~add more or less distortion to~~ distort the signal they are designed to amplify. The reason for this is that a power amplifier has a non-linear input-output signal characteristic. This shows up as a broadened spectrum around the desired amplified signal, and as an unwanted inband component of the signal. As a counter-measure to decrease the effects of non-linearity, it is known to pre-distort the signal at the input of the amplifier as to give an un-distorted amplified signal at the output of the amplifier. This technique is called pre-distortion. Pre-distortion as implemented today normally uses a look-up table that is used to multiply the signal. The entry into the table is the magnitude of the signal at every time sample.

Please amend the paragraph beginning at page 2, line 24, as follows:

An object ~~of the present invention~~ is to provide a computationally efficient pre-distortion method based on memory polynomials.

Please delete the paragraph beginning at page 2, line 27, which starts with:

This object is achieved in...

Please amend the paragraph beginning at page 29, as follows:

Briefly, the ~~present invention~~ technology described here is based on the insight that the memory polynomial approach can be implemented as a FIR type structure, in which the "filter taps" are replaced by look-up tables (representing sampled polynomials) triggered by the input signal amplitude. Preferably further look-up tables are used to track changes in the characteristics of the power amplifier due to, for example, heating of semi-conductor components.

Please delete the paragraph beginning at page 3, line 6, which starts with:

The invention, together with...

Please amend the paragraph beginning at page 3, line 15, as follows:

_____Fig. 4 is a diagram illustrating the input-output signal characteristic of a power amplifier provided with pre-distortion;

Please amend the paragraph beginning at page 3, line 17, as follows:

_____Fig. 5 is a diagram illustrating the spectrum of the signal amplified by a non-linear power amplifier with memory;

Please amend the paragraph beginning at page 3, line 19, as follows:

Fig. 6 is a diagram illustrating sampling of polynomials in accordance ~~with the present invention~~;

Please amend the paragraph beginning at page 3, line 21, as follows:

1410638

Fig. 7 is a block diagram of an exemplary embodiment of a pre-distorter in accordance with the present invention;

Please amend the paragraph beginning at page 3, line 23, as follows:

Fig. 8 is a block diagram of another exemplary embodiment of a pre-distorter in accordance with the present invention;

Please amend the paragraph beginning at page 3, line 25, as follows:

Fig. 9 is a block diagram of another exemplary embodiment of a pre-distorter in accordance with the present invention;

Please amend the paragraph beginning at page 3, line 27, as follows:

Fig. 10 is a block diagram of another exemplary embodiment of a pre-distorter in accordance with the present invention;

Please amend the paragraph beginning at page 3, line 29, as follows:

Fig. 11 is a block diagram of another exemplary embodiment of a pre-distorter in accordance with the present invention; and

Please amend the paragraph beginning at page 3, line 31, as follows:

Fig. 12 is a block diagram of an exemplary embodiment of a base station including a power amplifier provided with a pre-distorter in accordance with the present invention.

Please amend the paragraph beginning at page 4, line 6, as follows:

~~Before the invention is described in detail, a~~ A brief description of the underlying problem will now be given with reference to Fig. 1-5.

Please amend the paragraph beginning at page 7, line 15, as follows:

In the ~~exemplary~~ non-limiting, example embodiment ~~of the present invention~~ illustrated in Fig. 7, the complex input signal $x(n)$ is forwarded to an absolute value block 10 and to a multiplier 12. The absolute value signal from block 10 is forwarded to a look-up table LUT0 representing a sampled version of polynomial T_0. The corresponding (generally complex) value from look-up table LUT0 is forwarded to multiplier 12, where it multiplies the input signal sample $x(n)$. Input signal $x(n)$ is also forwarded to a delay block D, where it is delayed one sample period for forming a delayed sample $x(n-1)$. This delayed sample is processed in the same way as the non-delayed sample by an absolute value block 10, a multiplier 12 and a look-up table LUT1. However, look-up table LUT1 now represents a sampled version of polynomial T_1 instead of T_0. As illustrated in Fig. 7, further delays and look-up tables may be included (as indicated by the dots in the figure). Finally, the obtained products are added to each other in adders 14 to form the pre-distorted signal $PD(n)$. The ~~Look-up~~ look-up tables ~~used in accordance with the present invention~~ make computation in real time much more efficient than the polynomial computation for each sample of the input signal used in [3]. The look-up tables may be updated to keep track of slow changes in the characteristics of the power amplifier.

1410638

Please amend the paragraph beginning at page 10, line 12, as follows:

In the ~~exemplary~~ non-limiting, example embodiment illustrated in Fig. 8 the delay depth is 2 (Q=2) and the McLaurin expansion includes 3 terms (M=3). Further terms and delays are possible, but these numbers have been chosen, since they are sufficiently large to illustrate the principles and sufficiently small to avoid cluttering of the figure. Each delay branch includes 3 look-up tables, for example LUT11, LUT12, LUT13, triggered by the same absolute signal value, $|x(n\text{-}1)|$ in this case. This embodiment also includes a block 16 for calculating the average power z of the input signal. Block 16 may also include a smoothing filter (for example a FIR or IIR filter) to prevent abrupt changes in the power signal. The power value is forwarded to a multiplier 18 in each branch, where it is multiplied by the value from the corresponding look-up table LUT02, LUT12 or LUT22. The power value z is also forwarded to a squaring block 20 in each branch. A multiplier 22 multiplies the resulting squared power by the value from the corresponding look-up table LUT03, LUT13 or LUT23. These products are added in adders 24, and the sums are added to the values from look-up tables LUT01, LUT11 and LUT21 in adders 26. The resulting sums from adders 26 form the filter coefficients of the filter structure. From Fig. 8 and equation (7) it is noted that the embodiment of Fig. 7 and equation (2) may be considered as the special case z=0. A method for determining the look-up tables is described in the APPENDIX.

Please amend the paragraph beginning at page 11, line 21, as follows:

Fig. 12 is a block diagram of ~~an exemplary~~ a non-limiting, example embodiment of a base station including a power amplifier provided with a pre-distorter ~~in accordance with the present invention~~. In Fig. 12 elements that are not necessary for understanding ~~the invention~~ have been omitted. The

baseband complex signal $x(n)$ is forwarded to a pre-distorter 30 in accordance with the present

invention. The pre-distorted signal is up-converted to intermediate frequency (IF) in a digital up-

converter 32 and converted into an analog signal in a D/A converter 34, which in turn is up-

converted to radio frequency (RF) by an analog up-converter 36. The RF signal is forwarded to a

power amplifier 38, and the amplified signal is forwarded to an antenna. The amplified RF signal is

also forwarded to a feedback down-conversion chain including an analog down-converter 40, an

A/D converter 42 and a digital down-converter 44. The down-converted feedback signal is

forwarded to a trainer 46, which also receives the pre-distorted input signal for determining the

look-up tables in pre-distorter 30 in accordance with the mathematical principles described above.

In this embodiment pre-distorter 30 may, for example, be implemented as in Fig. 8 or 10, but

provided with a temperature sensor 48 sensing the power amplifier temperature instead of a power

calculation block 16.

Please amend the paragraph beginning at page 12, line 22, as follows:

Although ~~the present invention has been~~ described with reference to a FIR filter structure, it is

also possible to use the same principles for an IIR (Infinite Impulse Response) filter structure. or

a combination of FIR and IIR filter structures. Thus the most general filter structure in which the

~~invention~~ technology may be implemented is a discrete time filter structure.

Please amend the paragraph beginning at page 12, line 28, as follows:

It will be understood by those skilled in the art that various modifications and changes

may be made ~~to the present invention~~ without departure from the scope ~~thereof~~ of the invention,

which is defined by the appended claims.